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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LAM, ANN Y	
ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/973,629	CHENG ET AL.	
	Examiner	Art Unit	
	Ann Y. Lam	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *61-78* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *61-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 19, 2005 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 69 and 75 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 69 and 75 are vague and indefinite because they recited an array of electromagnetic units and a traveling wave dielectrophoresis electrode array but do not indicate whether or not the chip or biochip system comprises these elements.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 61-78 are rejected under 35 U.S.C. 102(e) as being anticipated by Pourahmadi et al., 6,440,725.

As to claim 61-62, Pourahmadi et al. disclose a biochip system wherein at least one of the chips (col. 2, lines 27-33) is a multiple force chip (col. 19, lines 17-19, and col. 25, lines 45-50

and figures 6 and 7, disclosing resistive heating element 34 on the bottom surface of substrate 22, and col. 21, line 35 – col. 22, line 2, disclosing electrodes in contact with fluid for manipulation of molecules), wherein the multiple force chip comprises multiple functional elements in different structurally linked layers that are capable of being vertically oriented with respect to one another (the resistive heating element 34 is disclosed on the bottom surface of the substrate, below the fluid channels, and the electrodes are disclosed as being in contact with the fluid, that is, in the fluid channels, vertically oriented with the resistive heating element), wherein the biochip system can

perform two or more sequential tasks (heating and moving molecules), including a processing task (heating.)

As to claim 63, the multiple force chip comprises an electromagnetic element (col. 18, lines 40-50.)

As to claim 64, the chip comprises an electrode (col. 21, line 35.)

As to claim 66, the chip comprises a particle switch layer (22.)

As to claim 67, the chip comprises a chamber (see fig. 6 for example.)

As to claim 69, an array of electromagnetic units can move one or more sample components from one area of the chip to one other area of the chip by traveling wave magnetophoresis (col. 18, lines 40-50).

As to claim 70, a sample applied to the biochip system can remain continuously within the system from the beginning of the first sequential task until the end of the last sequential task performed by the system. (Examiner notes that this limitation relates to intended use and that a sample in the biochip is capable of remaining continuously within the system as claimed.)

As to claim 71, the biochip system is automated (see for example, col. 18, lines 40-50.)

As to claim 72, the biochip system comprises more than one chip (col. 2, lines 27-33).

As to claim 73, Pourahmadi et al. disclose a biochip system comprising

two or more chips (col. 2, lines 27-33),

wherein at least one of the chips is a multiple force chip (col. 19, lines 17-19, and col. 25, lines 45-50 and figures 6 and 7, disclosing resistive heating element 34 on the bottom surface of substrate 22, and col. 21, line 35 – col. 22, line 2, disclosing electrodes in contact with fluid for manipulation of molecules)

and further wherein the biochip system can perform two or more sequential tasks (heating and moving molecules), wherein at least one of the sequential tasks is a processing task (e.g., heating);

further wherein at least two of the chips can be, for at least a part of the time during the operation of the biochip system, in fluid communication with each other (col. 19, lines 17-19.)

As to claim 74, sample components can be moved from one chip to another by a mechanism other than fluid flow (see for example, col. 18, lines 40-50, disclosing movement by traveling wave electromagnetophoresis, or col. 18, line 63- col. 19, line 7, disclosing electrophoresis.)

As to claims 65, 68 and 75, a traveling wave dielectrophoresis electrode array (col. 21, line 56 – col. 22, line 2) and an array of electromagnetic units (col. 18, lines 40-50) are disclosed.

As to claim 76, at least one of the chips is a passive chip. (Examiner notes that this limitation refers to an intended use, and the chip is capable of not being actively used.)

As to claim 77, at least two of the chips are active chips (Examiner notes that this limitation refers to an intended use, and the chip is capable of being used.)

As to claim 78, at least one of the active chips is a particle switch chip. (col. 21, lines 56-57.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 61-64, 66-67, 70 and 71are rejected under 35 U.S.C. 102(e) as anticipated by Anderson et al., 6,168,948, or, in the alternative, under 35 U.S.C. 103(a) as obvious over Anderson et al., 6,168,948.

As to claim 61-62, Anderson et al. disclose a biochip system wherein at least one of the chips (col. 15, lines 57-61) is a multiple force chip (i.e., electromagnetic and piezoelectric actuators, col. 21, line 42), wherein the multiple force chip comprises multiple functional elements in different structurally linked layers that are capable of being vertically oriented with respect to one another (e.g., electromagnetic actuators, col. 21, line 42, and acoustic energy source for lysing cells, col. 42, lines 19-24), wherein the biochip system can perform two or more sequential tasks (e.g., electromagnetic actuators for deflection of a valve, co.. 21, lines 40-42, and acousting mixing (col. 32, line 41, or acoustic energy for lysing cells, col. 42, lines 19-24), including a processing task (e.g., acoustic mixing, col. 32, line 41.) As indicated above,

the multiple functional elements are considered to be in different layers that are vertically oriented with respect to one another because they are capable of being vertically oriented with respect to one another, by for example turning the biochip system.

In the alternative, it would have been obvious matter of design choice to modify the Anderson et al. invention such that the different functional elements are in layers that are vertically oriented with respect to one another because Applicant has not disclosed that this configuration solves any stated problem or is for any particular purpose and it appears that the vertical orientation would perform equally well with a non-vertical orientation.

With respect to the following claims, Anderson et al. disclose the limitations as follows.

As to claim 63, the multiple force chip comprises an electromagnetic element (col. 21, line 42.)

As to claim 64, the chip comprises an electrode (col. 7, line 60.)

As to claim 66, the chip comprises a particle switch layer (i.e., electrode, col. 7, line 60.)

As to claim 67, the chip comprises a chamber (col. 32, line 42.)

As to claim 70, a sample applied to the biochip system can remain continuously within the system from the beginning of the first sequential task until the end of the last sequential task performed by the system. (Examiner notes that this limitation relates to

intended use and that a sample in the biochip is capable of remaining continuously within the system as claimed.)

As to claim 71, the biochip system is automated (see for example, col. 44, line 4.)

4. Claim 61-64 and 6-78 are rejected under 35 U.S.C. 102(e) as anticipated by Christel et al., 6,368,871, or, in the alternative, under 35 U.S.C. 103(a) as obvious over Christel et al., 6,368,871.

As to claim 61, Christel discloses a biochip system wherein at least one of the chips (col. 1, line 65) is a multiple force chip (i.e., dielectrophoresis, col. 9, line 13, and piezoelectric ceramic disk, col. 9, line 23, and resistive heater elements, col. 9, line 29),

wherein the multiple force chip comprises multiple functional elements in different structurally linked layers that are capable of being vertically oriented with respect to one antoehr;

wherein the multiple force chip comprises at least one acoustic element (i.e., piezoelectric ceramic disk, col. 9, lines 23); further wherein the biochip system can perform two or more sequential tasks, including a processing task (i.e., moving the nucleic acids, col. 9, lines 11-14, or heating for denaturation or lysis or for polymerase and ligase chain reactions, col. 9, lines 31-34).

As indicated above, the multiple functional elements are considered to be in different layers that are vertically oriented with respect to one another because they are capable of being vertically oriented with respect to one another, by for example turning the biochip system.

In the alternative, it would have been obvious matter of design choice to modify the Christel et al. invention such that the different functional elements are in layers that are vertically oriented with respect to one another because Applicant has not disclosed that this configuration solves any stated problem or is for any particular purpose and it appears that the vertical orientation would perform equally well with a non-vertical orientation.

With respect to the following claims, Christel et al. disclose the limitations as follows.

As to claim 64, the chip comprises an electrode (col. 9, line 40.).

As to claim 67, the chip comprises a chamber (col. 19, line 17.)

As to claim 70, a sample applied to the biochip system can remain continuously within the system from the beginning of the first sequential task until the end of the last sequential task performed by the system. (Examiner notes that this limitation relates to intended use and that a sample in the biochip is capable of remaining continuously within the system as claimed.)

As to claim 71, the biochip system is automated (col. 4, line 3.)

As to claim 72 and 73, Christel discloses a biochip system comprising two or more chips (col. 12, line 21), wherein at least one of the chips is a multiple force chip (i.e., dielectrophoresis, col. 9, line 13, and piezoelectric ceramic disk, col. 9, line 23, and resistive heater elements, col. 9, line 29) and further wherein the biochip system can perform two or more sequential tasks, wherein at least one of the sequential tasks is a

processing task (i.e., moving the nucleic acides, col. 9, lines 11-14, or heating for denaturation or lysis or for polymerase and ligase chain reactions, col. 9, lines 31-34);

further wherein at least two of the chips can be, for at least a part of the time during the operation of the biochip system, in fluid communication with each other (col. 12, lines 25-27.)

As to claim 74, sample components can be moved from one chip to another by a mechanism other than fluid flow (col. 9, lines 11-13.)

As to claims 68, 69 and 75, the sample components can be moved from one chip to another chip by traveling wave dielectrophoresis or traveling wave magnetophoresis. (Examiner notes that this element refers to an intended use and does not positively claim elements to carry out traveling wave dielectrophoresis or traveling wave magnetophoresis. Thus, the reference meets the claims if it is capable of performing the intended use. In this case, Christel discloses that the components can be moved by dielectrophoresis (col. 9, lines 13-15), and Examiner asserts that the components can be moved by traveling wave dielectrophoresis and traveling wave magnetophoresis as well.)

As to claim 76, at least one of the chips is a passive chip. (Examiner notes that this limitation refers to an intended use, and the chip is capable of not being actively used.)

As to claim 77, at least two of the chips are active chips (Examiner notes that this limitation refers to an intended use, and the chip is capable of being used.)

As to claims 66 and 78, at least one of the active chips is a particle switch chip. (i.e., the chip has dielectrophoretic elements, col. 9, line 13.)

Claim Rejections - 35 USC § 103

5. Claims 65 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al., 6,168,948, in view of Parton et al., 5,653,859.

Anderson discloses the invention substantially as claimed (see above.) More specifically, Anderson teaches that particles can be moved using dielectrophoresis (col. 58, lines 21-24.) However, Anderson does not disclose that the dielectrophoresis is specifically traveling wave dielectrophoresis.

Parton discloses that traveling wave dielectrophoresis is well known in the art used to move particles (col. 1, lines 9-13, and col. 6, line 66 – col. 7, line 4.) Traveling wave dielectrophoresis is a type of dielectrophoresis wherein a series of electrodes (i.e., more than 2 electrodes) are used to move particles (col. 6, line 66 – col. 7, line 4.)

It would have been obvious to one of ordinary skill in the art to substitute the traveling wave dielectrophoresis mechanism for the conventional dielectrophoresis in the Anderson chip as a functional equivalent since both perform the same function of using electrodes and an electric field to move particles.

Response to Arguments

Applicant's arguments have been considered but are not persuasive. Applicant argues that neither Anderson et al. nor Christel et al. teach that the multiple

functional elements are in different layers that are vertically oriented with respect to one another. As indicated above, this limitation is anticipated by Anderson et al. and Christel et al. because the disclosed devices are capable of being vertically oriented by for example turning the devices. In the alternative, such a modification would be an obvious design choice as described above. Also, newly cited reference Pourahmadi et al. more clearly indicate this limitation as described above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann Y. Lam whose telephone number is 571-272-0822. The examiner can normally be reached on M-Sat 11-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11/26/07